United States Environmental Protection Agency

Solid Waste and Emergency Response (55026)

EPA520-F-93-015
Summer 1993

EPA Superfund At Work

Hazardous Waste Cleanup Efforts Nationwide

Army Creek Landfill Site Profile

Site Description:
A former sand and gravel quarry located two miles southwest of New Castle, Delaware

Site Size: 47 acres

Primary Contaminants:
volatile organic compounds (VOCs), and heavy metals including chromium, iron, mercury, and zinc

Potential Range of Health Risks:
Long-term consumption of contaminants could lead to gastrointestinal disorders, liver and kidney damage

Nearby Population Affected:
130,000 people within three miles

Ecological Concerns:
Highquality wetlands, aquatic creatures and other wildlife

Year Listed on NPL: 1983

EPA Region: 3

State: Delaware

Congressional District: 1

Success In Brief

Environmental Victory At Army Creek Landfill

Through the efforts of the Superfund enforcement program, the U.S. Environmental Protection Agency (EPA) successfully negotiated with waste contributors to clean up the Army Creek Landfill site. both public water supplies and **fragile wetlands were** at risk from hazardous waste dumping in the 1960s. With the cooperation of New Castle County, EPA:

- Negotiated a $25 million cleanup of the landfill, ground water, and surface water;
- Employed the latest technologies to reduce the risk of contamination of local drinking water;
- Facilitated negotiations for an $800,000 settlement for restoration of wetlands affected by dumping in nearby Army Creek and Army Creek Pond; and
- Settled with 18 parties to recover $1 million in past cleanup costs.

The Army Creek settlement conserves Superfund dollars for hazardous waste sites where viable parties cannot be found to compensate for environmental damage. The use of private resources for cleanup demonstrates EPA's commitment to the environment through fair and equitable enforcement.

Photo: Robert Shallenberger, U.S. Fish and Wildlife Service

High quality wetlands surrounding Army Creek Landfill were contaminated with hazardous substances.

The Site Today

Early installation of ground water recovery wells substantially reduced the immediate threat of contamination to public water supply wells. To permanently control the source of contamination, waste contributors began building a multi-layer cap over Army Creek landfill in the spring of 1992.

In addition, workers started construction of a water treatment plant to decontaminate discharge from the recovery wells. EPA supervises all work performed at the site.

A Site Snapshot

The Army Creek Landfill, a former sand and gravel quarry, lies approximately two miles southwest of New Castle, Delaware. The abandoned landfill is bordered by Army Creek, which discharges into the Delaware River approximately one mile east of the site.

The residential community of Llangollen Estates, and a public supply well field operated by the Artesian Water Company, are located less than a mile south of the site. An estimated 130,000 people live within three miles of the site and rely on ground water for household use. Fortunately, drinking water supplies have not been contaminated.

Next to the landfill is the Delaware Sand and Gravel Landfill, another Superfund site. New Castle County owned and operated the 47-acre Army Creek Landfill between 1960 and 1968, when it was filled to capacity with two million cubic yards of industrial and municipal wastes. A variety of chemicals also were haphazardly discarded in the landfill.

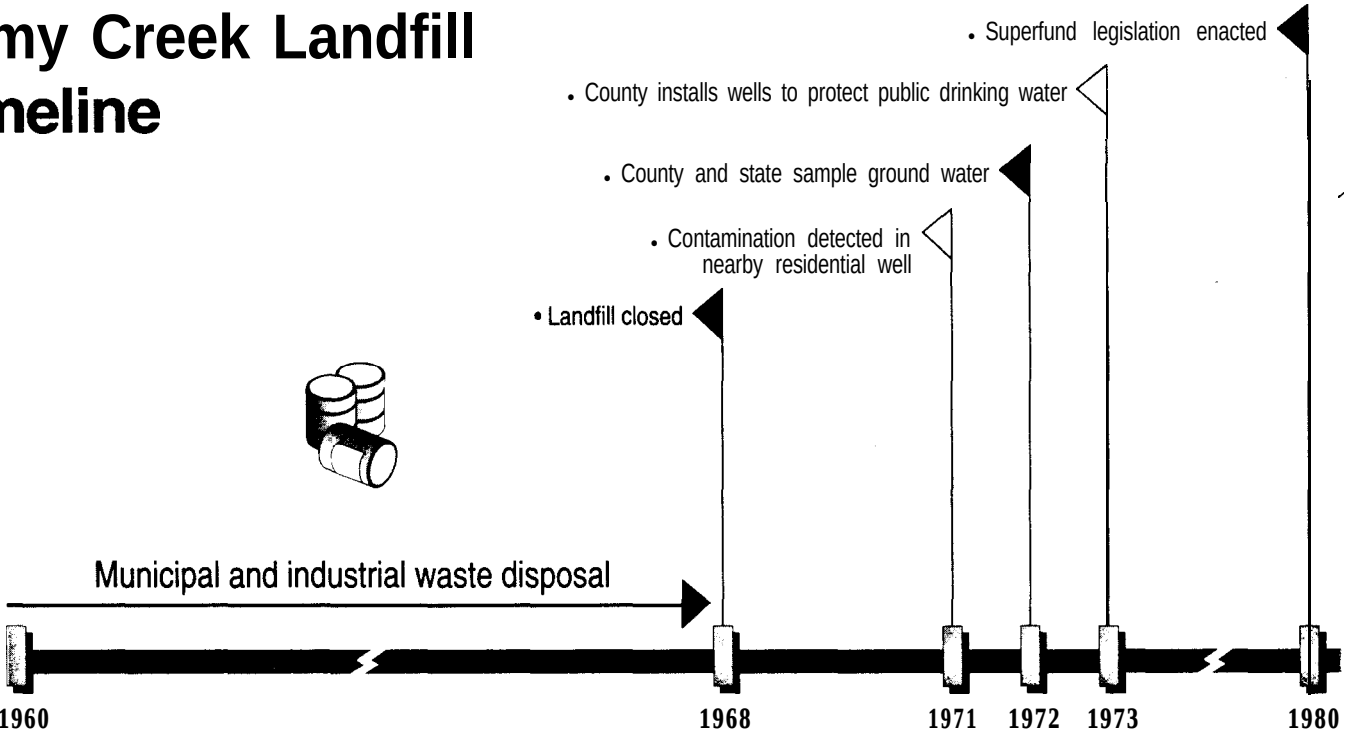
Volatile organic compounds and heavy metals have contaminated the ground water

Volatile organic compounds (VOCs) and heavy metals such as chromium, mercury, and zinc have contaminated the ground water.

The surface water is also degraded. High levels of these contaminants were detected in Army Creek and Army Creek Pond, a small body of water located southeast of the landfill.

Mercury and chromium have detrimental effects on aquatic creatures inhabiting the creek and wildlife frequenting the high-quality wetlands near the pond.

Army Creek Landfill Timeline



Hazardous Substances Leak into Ground Water

County Attempts To Curtail Pollution

Ground water contamination first became apparent in 1971 when a local resident reported that his well water had gone bad. In response, the State of Delaware and New Castle County began sampling the ground water in 1972. The County's studies sought to identify and define the extent of the contamination.

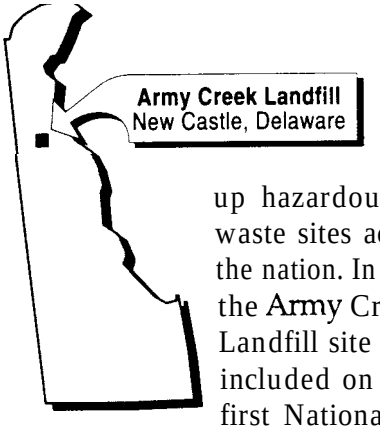
Contamination from two neighboring landfills was seeping into local aquifers

Investigations revealed that leakage originating from the two neighboring landfills was seeping underground and contaminating local aquifers, potentially affecting 5,000 residents. In response, the County installed a series of ground water recovery wells in 1973. This prevented the contaminants from reaching public supply wells belonging to the Artesian Water Company.

The recovery wells created an underground water divide between the landfills and the Artesian well fields. Contaminated ground water was pumped and brought to the surface for discharge into Army Creek and Army Creek Pond.

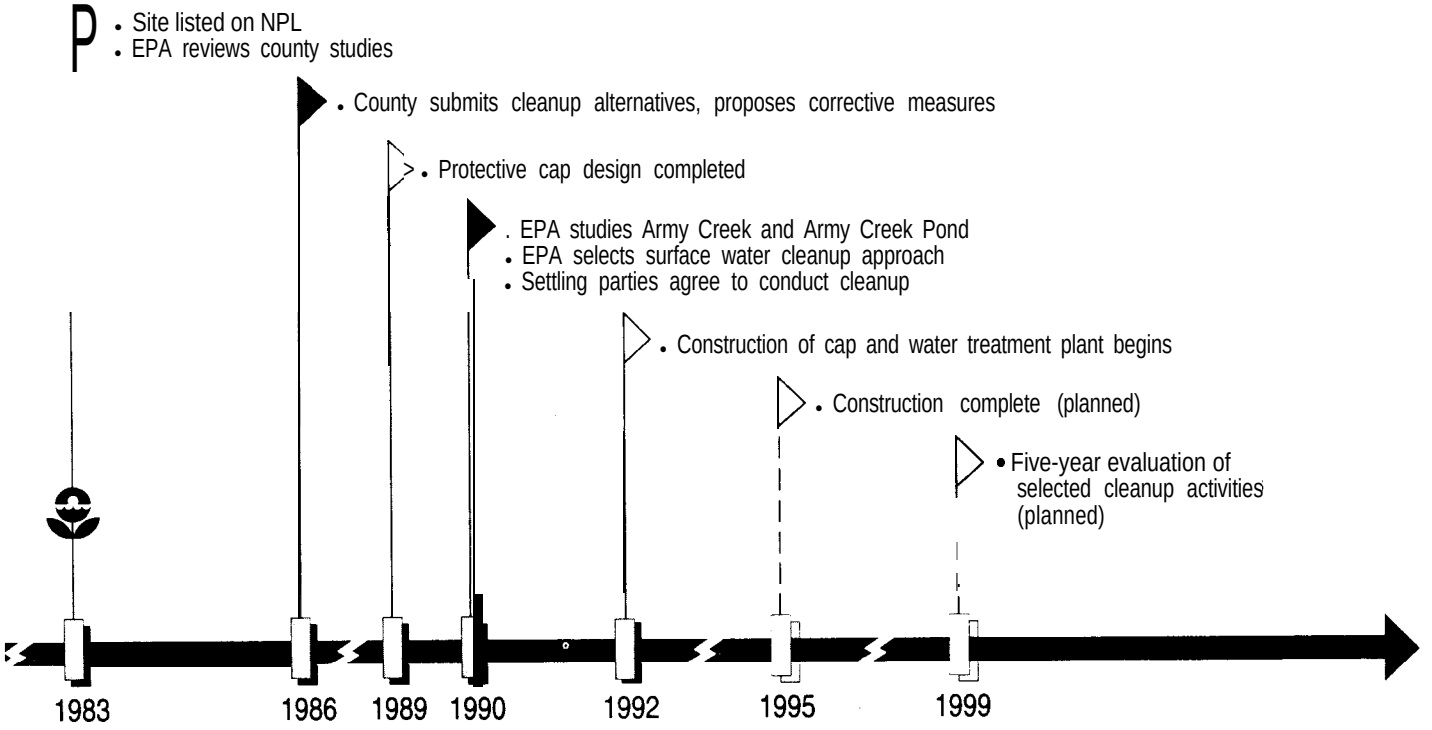
Army Creek Becomes Superfund Site

The Superfund program was created by Congress in 1980. This program gave EPA the authority to allocate federal funds to clean up hazardous waste sites across the nation. In 1983, the Army Creek Landfill site was included on the first National Priorities List (NPL), EPA's roster of sites eligible for cleanup.



At this time, EPA reviewed the County's studies, and determined their investigations were complete enough to serve as the first step in a Superfund cleanup: an official evaluation of the nature and extent of contamination at a site.

New Castle County agreed to go one step further by performing



an analysis of potential cleanup alternatives, including corrective measures for the site. Their analysis was completed in September 1986.

That summer, EPA identified over 20 corporate entities as potentially responsible parties and requested that they participate in carrying out the remedy selected for the site. The identified parties failed to reach-an acceptable agreement: therefore, EPA continued with the cleanup.

Twenty corporate entities were identified as potentially responsible parties

A worker smooths newly delivered soil for the protective cap, part of phase one of the cleanup.

EPA Chooses Remedy to Protect Ground Water

In 1986, on the basis of the county's analysis, EPA chose a remedy to control the source of ground water contamination. Phase one of the cleanup involved installing a protective cap to cover the landfill to prevent rainfall from infiltrating the hazardous waste. The cap would minimize any further migration of the ground water contaminants.

The recovery well network installed by the county to capture contaminated ground water would continue operations. In addition, the recovery wells also would be used to monitor the effectiveness of the cap over a five-year period.

During phase two of the cleanup, EPA will use the results of this five-year evaluation to determine whether additional pollution controls will be necessary. Monitoring and evaluation of the recovery well system will accompany its long-term operation and maintenance.

EPA Protects Natural Resources

Once the landfill cap was designed, EPA shifted its attention to the contamination of Army Creek and Army Creek Pond.

Surface water samples indicated that the creek and pond had been partially degraded by discharge from the recovery wells. In January 1989, EPA asked the waste contributors to cooperate in conducting a focused study of surface water contamination.

Once again, the notified parties refused to perform the study, and so EPA evaluated Army Creek and Army Creek Pond in February 1990.

Resulting data indicated elevated concentrations of chromium, cadmium, iron, mercury and zinc exceeding surface water quality standards, but only iron could be directly linked to the recovery well discharge. The other contaminants were believed to originate from Army Creek leachate or off-site surface runoff.

continued on page 5

Environmental Trustees to Restore Damaged Habitat

Federal and state natural resource trustees played a prominent role in the cleanup of the environment surrounding Army Creek Landfill. Settling parties agreed to pay an additional $800,000 to environmental trustees at the National Oceanic and Atmospheric Administration, the Department of the Interior, and the State of Delaware. The natural resource trustees will use this money to improve wetlands in the vicinity of the site.

This part of the settlement was intended to offset injury to wetlands and aquatic life resulting from the release of hazardous substances from the landfill and contaminated ground water discharged into Army Creek and Army Creek Pond.

Photo: U.S. Fish and Wildlife Service

Funds for improving nearby wetlands were part of the settlement

Hazards Leak into Ground Water

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In June 1990, EPA selected a cleanup remedy for the surface water, which involved construction of a water treatment plant. The treatment plant purifies the ground water brought up by the recovery wells prior to its discharge into Army Creek.

To track the level of contaminants, EPA will undertake a long-term monitoring program of ground water, surface water, sediments, and associated wetlands affected by the site.

Following extensive negotiations with EPA, the waste contributors began construction of the selected remedies in the spring of 1992.

EPA's Pursuit of Waste Contributors Pays Off

In September 1990, EPA reached a formal cleanup agreement with 18 waste contributors who were willing to enter into a mixed-funding agreement.

Under mixed funding EPA settles with fewer than all of the responsible parties at a site for a substantial portion of the cleanup. The remainder of the costs can be contributed by EPA, or obtained from other financially viable waste contributors. In the settlement with EPA, 18 parties agreed:

- To conduct a $25 million cleanup that involves building the cap, monitoring the pumping systems, and constructing and operating the wastewater treatment plant according to EPA specifications;
- To compensate EPA's Superfund program for $1 million in past costs; and
- To fund future EPA oversight costs, estimated at another $1 million.

This settlement provides recovery of approximately 71% of past response costs. In addition, the settling parties will undertake the remedies selected to address soil, ground water, and surface water contamination.

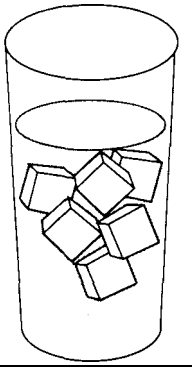
Success at Army Creek Landfill

By promptly addressing the immediate risk of ground water contamination, the Superfund program reduced the threat to drinking water supplies posed by the Army Creek Landfill. EPA al&responded to immediate environmental concerns by orchestrating comprehensive cleanup actions for the site.

EPA successfully concluded negotiations with 18 parties responsible for contaminants at the site. Under the terms of the settlement, the waste contributors will design and conduct a $25 million cleanup, and reimburse EPA for $1 million of previously incurred response costs.

In addition, federal and state natural resource trustees have received $800,000 to help them counteract damages to wetlands and aquatic life.

Although construction activities are scheduled to be completed in the spring of 1995, the potential for exposure to contaminants at this site has been eliminated.



The safety of the drinking water supply was greatly enhanced by prompt actions at the Army Creek Landfill site

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